1574

ROL-
2699

U.S. Forest Service
Region 6

5200
Portland, Oregon
August 10, 1977

INTERIM REPORT
1977 Western Spruce Budworm Control Project
North-central Washington and Warm Springs Indian Reservation, Oregon

by
Jack Mounts

INTRODUCTION

The current western spruce budworm infestation in north-central Washington has been increasing since its inception in 1970, when 18,000 acres were defoliated. By 1976 the infested area had increased to over 1,100,000 acres. During the 6-year period the infested stands have been subject to tree mortality, top-killing, growth loss, increased fire hazard, lowered recreational and aesthetic values, and decreased wildlife habitat.

In 1976, 359,000 acres of the infestation were treated with technical grade malathion at the rate of 13 ounces per acre. An additional 7,600 acres were treated with Sevin 4 Oil at the rate of 1 pound in 1/2 gallon of diesel fuel per acre. The malathion treatment was satisfactory on only about 240,000 acres, the other 125,000 acres needing retreatment. The Sevin 4 Oil was highly successful in reducing the population; producing an unadjusted mortality rate of 96.7 percent as opposed to an average unadjusted mortality rate of 83.9 percent for malathion.

An environmental statement was prepared listing alternatives for control of the budworm. On the basis of the Draft Statement the Spruce Budworm Steering Committee, composed of landowners and land managers of the infested areas, made a tentative decision to treate approximately 460,000 acres with Sevin 4 Oil. When the Final Environmental Statement was filed, this decision became final.

SCOPE OF THE PROJECT

Approximately 357,000 acres of timberland infested with spruce budworm were treated in 1977, all with Sevin 4 Oil at 1 pound active ingredient per acre in 1/2 gallon of total formulated material.

All applications were by helicopters equipped with beecomist rotary atomizing nozzles. Application was observed and directed by trained aerial observers in separate observation helicopters.

Because of the high temperatures and a serious drought situation, the insect development was earlier and faster than usual. In addition, unseasonally windy weather reduced the available spray time and as a result of these two meteorological conditions, about 125,000 acres of the originally planned acreage reached pupation before treatment could be applied.

ORGANIZATION

The Project was divided into three control units with headquarters at Twisp, Cashmere, and Ellensburg, Washington. The Warm Springs Indian Reservation was administered from the Ellensburg Unit headquarters. Each Control Unit was further divided into subunits for ease of effectiveness evaluation. Subunits were then divided into spray blocks ranging in size from 500 acres to over 5,000 acres, depending on elevation and aspect. This aided application timing.

The Project headquarters, which was located at Cashmere, Washington, provided overall direction and coordination to the three control units, each of which was directed by a Unit Supervisor.

Contracts for application and aerial observation were awarded by control units, with the exception of the Okanogan Unit, which was divided between two application contractors. A separate contract was awarded for formulating the chemical and providing storage tanks and transportation of the insecticide from the central mixing plant to satelite tanks at Twisp and Ellensburg.

A contract was again awarded to the Washington State Department of Ecology for environmental monitoring of fish, aquatic organisms, and water, on all three control units. Monitoring of birds and bees was carried out by Project personnel under the overall supervision of the Project Environmental Monitoring Coordinator and Unit Environmental Coordinators.

EFFECTIVENESS DETERMINATION

TIMING OF INSECTICIDE APPLICATION

Insect development plots were installed in most spray blocks to determine when insects were in the optimum stage of development for control. In some cases one plot was used to sample more than one spray block because of access problems. In many cases, more than one development plot was located in a spray block to check development at both upper and lower elevations in the block. Generally, treatment of a spray block took place within 3 days of the time that an average of 40 percent of the insects in the block reached the fifth instar or larger. In some cases, because of rapid development, logistics prevented treating some blocks within the 3-day period.

When a spray block attained a 5 percent or greater pupation rate, it was eliminated as a treatment area. This occurred on approximately 125,000 acres on the Project, primarily because of extremely hot and dry weather, and unusually strong winds.

EVALUATION OF TREATMENT EFFECTIVENESS

Evaluation plots were located throughout the treatment areas. Each evaluation plot consisted of three trees. Twenty-six plots were installed in each major subunit. However, because of pupation in many areas, postspray evaluations were made on less than 26 plots per subunit.

Two branches were sampled from each tree in the plots for the prespray sample. In the postspray sample, four branches were sampled from each tree.

Plots were randomly selected within the limits of sampling size and accessibility. Postspray samples were taken 14 days after treatment of the block. All sample trees were Douglas-fir or true fir, 30 to 50 feet tall, with some previous defoliation. All trees in a plot were located within an area not exceeding 1 acre. Population estimates were based on counts of budworm per 100 buds.

RESULTS

At this time only preliminary results, not corrected for natural mortality, are available. Complete results will be given in the final project report.

Preliminary results of mortality are as follows:

Control Unit	No. Plots	Prespray Insects/ 100 Buds	Postspray Insects/ 100 Buds	Mortality Percent
Ellensburg				
Teanaway Subunit	24	21.50	2.50	88.40
Cle Elum Subunit	24	17.60	0.90	94.90
Swauk Subunit	25	11.90	1.30	89.10
Average		17.00	1.60	90.60
Check	25	21.60	4.80	77.80
Wenatchee				
Tronsen Subunit	27	14.40	1.23	91.46
Entiat Subunit	18	12.42	3.00	75.85
Tumwater Subunit	6	20.04	1.19	94.06
Average		15.62	1.81	88.41
Check	11	6.88	3.07	55.38
Okanogan				
Buzzard Subunit	26	37.67	1.23	96.73
Loup Loup Subunit	26	20.99	1.40	93.34
Mazama Subunit	26	10.24	0.49	95.22
Pearrygin Subunit	26	8.35	1.03	87.67
Thompson Subunit	14	18.73	1.14	93.92
Twisp Subunit	18	12.68	0.89	92.99
Average		18.11	1.03	94.31
Check	26	27.01	12.91	52.21
Overall Project Results		17.21	1.36	92.10

SUMMARY

The above results are very preliminary and subject to change due to errors and adjustment for natural mortality. They are presented merely to give the reader a very general idea of the results of the Project.

These preliminary results indicate that the Sevin 4 Oil treatment was very effective, especially in reducing insect populations below the goal of three insects per 100 buds. The average for the Project was 1.36 insects remaining per 100 buds which should prevent unacceptable damage to these stands in 1978.

Since almost 125,000 acres planned for treatment were not treated in 1977 due to unfavorable spraying conditions, these areas will probably have heavy populations in 1978. In addition, reinfestation may occur in treated areas adjacent to areas deleted. Other areas of damage outside of original spray boundaries also showed up during the summer. It may be necessary to treat these areas in 1978. A re-evaluation of the need for further treatment will be made when information from the fall egg mass surveys is available in the late fall of 1977.